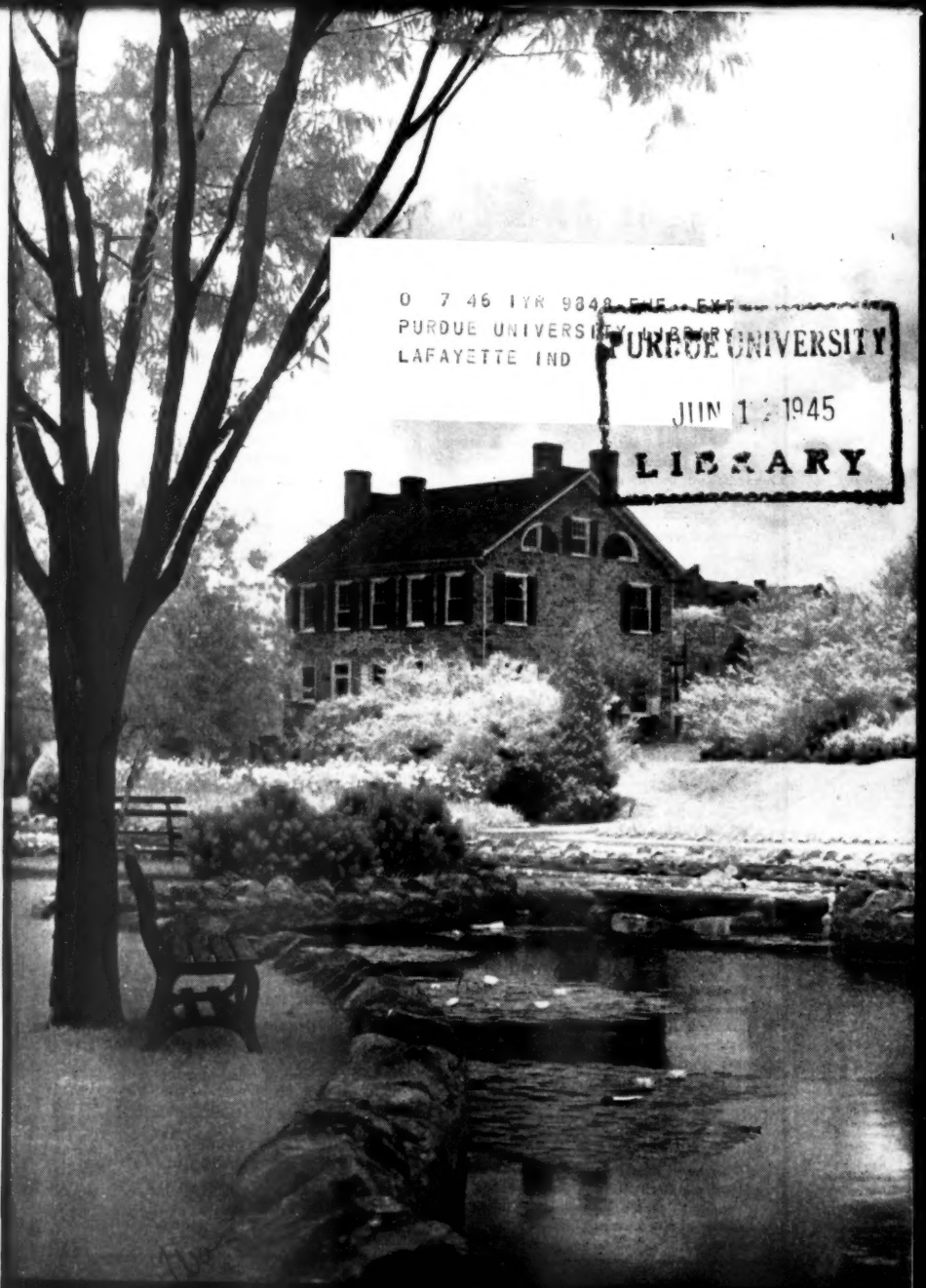

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ORGANIC GARDENING—Emmaus, Pa.

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With The Editor

Rock Mulches

MY dictionary defines a mulch as a layer of dried leaves, straw, etc., used to protect the roots of trees and plants. Actually, a much more comprehensive group of materials is intended when one thinks of mulches. Roll paper is made specifically as a mulch material. Even cinders have been used, but recently there came to my attention the use of stones and the results were so amazing that this may seriously be considered for use in the small home orchard.

In the July, 1944 issue of *The Flower Grower* there appeared an article by Walter J. Muilenberg describing an experience with the Canada Hemlock (Tsuga Canadensis). In northeastern Michigan this tree is never found in pure stands. It is mixed in with hardwoods that protect it from the wind and sun. It seems impossible to transplant them and make them grow under ordinary conditions. Muilenberg was clearing land and pulling out stumps when he came upon three hemlocks. He decided to let them grow and cleaned out everything else around them. A lot of stones accumulated and by sheer accident they were piled under one of the hemlocks. That is the only one that lived. The other two died in a few years. The peculiar thing is that the one with the stone mulch has become a wonderful specimen, far superior to the twisted and scraggly hemlocks usually seen in the forest.

Muilenberg says, "It is my guess that the third hemlock survived because of the rock, a weight of several tons, which had been piled around it. It had grown up in heavy woods, which consequently helped to make it more shallow-rooted, and in heavy shade, which helped to keep the soil cool and moist. Later, when the rest of the trees were removed, rock gave the tree a good grip on the soil and made for a cool, moist root-run, as rock always does. It would seem that the top of the tree will get along in good shape so long as the roots have protection."

Another case of a stone mulch came to my attention last year when one of our readers Dr. I. K. Tuttle of West Hutchinson, Kansas, who had wonderful results with peach trees raised in the organic manner, wrote, "I also have a lot of rocks laying under my prize trees. They hold the moisture in the ground and keep the hot sun from reaching the roots."

These Rock Gardens were designed by F. E. Blunck & Son, Brentwood, Pa.

In reading *Trampling Out the Vintage* by Joseph A. Cocannouer (on sale by *Organic Gardening*), I came across the following passage, "It was in Bavaria where I learned for the first time that stones spread over the ground between the rows of growing crops formed an excellent mulch for preserving the soil moisture."

There must, therefore, be sufficient value in using stones as a mulch to make it worthwhile to experiment further. We have done this under two older apple trees recently. In connection with the planting of a new fruit orchard, we have stone-mulched every other tree. The remaining trees were mulched with green matter. Perhaps in a few years the advantages may show up.

Thus far I have seen two actual advantages. First, where a stone mulch is put under a tree it lasts much longer than a straw mulch. The latter is absorbed into the ground in a few years and then through pressure of other work, or carelessness, no mulch is applied and the weeds begin to grow. One of the prime purposes of a mulch is to prevent the grass and weeds from growing under the tree because this grass competes with the roots of the tree for nourishment. When an ordinary mulch is applied it does not take long before it has settled and the weeds begin to shoot through.

Secondly, there are special situations where this kind of mulch comes in handy. For example, we have tried to start young trees in a chicken pasture, but the poultry always rooted under them and exposed the roots. Now, we apply a stone mulch and the chickens cannot interfere.

The most important benefit of a stone mulch would be its moisture-conserving propensities. Because of its mass, it would appear to do a better job in this respect than a straw mulch. Another advantage

which must not be overlooked is the gradual and slow disintegration of the nether surface of the stones and the washing of this debris into the soil. This would have considerable fertilizer value of a beneficial nature. The softer stones such as limestone, of course, would disintegrate most readily.

A very important aspect of the subject would be the fact that stones keep the air above them warmer, since they absorb heat and give it off slowly. Thus the length of the warm day is considerably increased. The lime rocks it seems especially have the effect of warming up the soil. Experiments have shown that the difference between lime-loving plants and others is often nothing more than that the lime-lovers need more warmth. A difference of 27° (F) in April and 20° (F) in September near the ground when compared with the general air temperature makes a great difference to the growing time of a plant that needs warmth. There may be other reasons for the adopting of stone mulches which may be discovered later.

Stones serve a purpose below the surface similar to that exerted by stones in a mulch. An old gardener once told me that a doctor friend of his, in preparing a seed bed for his garden worked down into the soil for over a foot and sieved out all the stones, however tiny. The old man warned him, that the small stones should be left in the soil otherwise he would have poor gardening results. He proved to be right and the doctor admitted it later.

In this connection, John Evelyn, Esq., F. R. S., a famous husbandman of those days, delivered a discourse on "Earth" at a public meeting of the Royal Society, held at London, England on April 29, 1675. His lecture ran to 21,500 words much of which covers the value of using compost on the land. Regarding stones he says, "Here I take notice that husbandmen observe a too clean and accurate gathering of stones from off those grounds which lie almost covered with them, which rather impoverishes than improves them, especially where corn is sown, by exposing them to heat and cold. Certain it is that a moderate interspersion of the smaller gravel preserves the earth from too sudden exhalation; whilst too fine a sifting makes it apt to constipate and grow stiff on wetting.

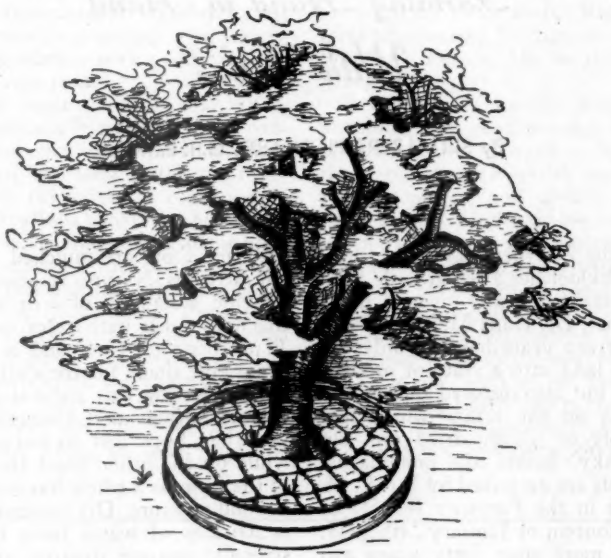
"This is a document for ignorant gardeners who, when they have a fine flower, think they can never make the ground fine enough."

I was explaining this whole stone-mulch theory to a nurseryman who immediately came in entire accord with it. He said that he had seen rhododendrons growing among rocks in the woods, that were taller than a man. Here's a chance for rhododendron lovers to try it out in the garden.

There are many plants that thrive in rock gardens. Evidently they benefit from the dissolved rock which saturates the soil. In this respect, it is interesting to note that rock garden plants are rarely afflicted with disease.

There are limitations to the use of stone mulches. In some regions stones aren't easily available. In the case of large commercial orchards the cost must be considered but even they might experiment on a small scale.

A few months ago, while walking on the mall in New York's Central Park I came upon trees that had cobblestones laid under them in a neat pattern as shown in the accompanying picture. Thinking that it might have been done for the purpose of aiding the growth of the trees, I wrote to the Director of Horticulture of the park and here is his reply:



"With reference to the cobblestones around the base of the trees on the Mall in Central Park, these stones were placed there about five years ago to replace iron grills and guards, which had deteriorated after many years from corrosion, and which also were injuring the trees as they became too small around the trunks.

"The cobblestones were substituted to prevent excessive trampling of the soil by the thousands of visitors who use this area attending band concerts, celebrations of distinguished guests, etc."

It is possible that these cobblestones may have helped but with such trees the benefits may be ever so slight and hardly discernible. There may be a valuable lesson here. Where readers decide to experiment with a stone mulch under one or two fruit trees they may lay a neat border of brick on the outside limits and dig the rocks in, in a neat pattern. Other designs may be figured out. It would be nice to get photographs from readers who try it.

After the mulch lies for a year or so, it is still possible to apply compost without disturbing the rocks. In this respect remember that if there is one place where you must apply the best and the most completely finished compost, it is fruit trees. Never use raw manure or partly finished compost under fruit trees. Direct the compost between the stones and hose it in if you can. Otherwise the rains will gradually do that.

I am sure that many of our readers will experiment with the stone mulch idea. If so be sure to write us if you note any results, one way or the other.

J. I. RODALE.

Farming Hand in Hand With Nature

By SIR ALBERT HOWARD, C. I. E., M. A.

IN the Northern Transvaal near Duivelskloof lies a remarkable farm —Westfalia Estate—owned by a geologist, Dr. Hans Merensky, who in fourteen years has not only put ruined land into a state of productivity, but also restored springs and streams on the estate which had partially or wholly dried up. Dr. Merensky's sound and imaginative methods are described by Mr. E. M. Palmer in the *Farmer's Weekly* of Bloemfontein of January 24th 1945.

Not more than forty years ago Westfalia Estate was virgin land, but steam-ploughing up and down the slopes and monoculture of crops resulted in rapid destruction of the humus in the top soil followed by erosion. Much of the top soil had gone. Termites swarmed everywhere. Many of the once permanently running streams were dry or ran only after rain.

The first problem to be tackled was control of the termites. Hundreds of queens were dug out of the soil. Then numbers of *Eucalyptus saligna* trees were planted, the leaves, twigs, and bark of which produced, after some years, a thick layer of humus, and under these moisture conditions the termites did not reappear.

Besides its value in humus formation, *Eucalyptus saligna* rapidly forms a canopy and shades the soil beneath it. Dr. Merensky has paid particular attention to the vital necessity of protection from the sun for soil, water, and animals. Orchard tree roots are mulched. Along the streams Nature is allowed to provide a canopy of fern and indigenous bush with trees over all. Plantations of trees and a roofed kraal give shade for the cattle.

By allowing this natural growth around springs and streams, little land has been lost to cultivation, while on the other hand the value of the farm as a whole has increased beyond measure. Dry water-courses or trickles of water have become strongly running streams, and the Ramadiepa river fed by springs on Westfalia, once not known as a river at all, now runs throughout the year. The natural vegetation, filtering and retaining water like a sponge, has made silting and erosion things of the past.

Lands are composted at the rate of 40 tons per acre. All compostable material is carted to the cattle kraals for bedding and later piled into heaps and turned when necessary. In this way the manufacture of compost is fitted into normal farming routine with a minimum of cost and effort.

Dr. Merensky's citrus orchards provide an outstanding example of how poor soil may be built up to a state of productivity. On taking over the farm, experts advised him to scrap the trees: they were yellow and unhealthy: the soil was worn out. He determined instead to recreate the land with manure and green-manure. To-day those same trees, healthy and flourishing, yield

fruit with a sugar content well above Government standard. His 2,500 avocados supply the Johannesburg market with good fruit the whole year round.

Even more striking than these achievements in soil and water conservation and the renewed productivity of the land is the improvement in the physical condition of the Westfalia native labourers, whose health and contentment have contributed to the success of the whole undertaking. Their lands are contoured; the manure from their cattle is given back to the soil; good seed is supplied for their crops, and they have learnt the value of a rotation with cowpeas. Irrigation is permitted only once in three years on the same block of land, and the plough is only used when the soil is too hard for cultivators. Recently, after vaccinating 200 natives on the Westfalia Estate, the local doctor wrote:

'I was struck by the wonderful physique and good average health of the natives. I have vaccinated thousands of natives this season at various places, and always found the incidence of certain diseases exceptionally high. The contrast was striking at Westfalia, where I did not see a single case of the diseases common among natives.'

What better testimony could Dr. Merensky have to the soundness of his policy of working in harmony with Mother Earth and to the value of his example in promoting health in soil, crops, live stock, and men?

Organic Food Shops

WORD comes from England that a store has opened that sells organically grown food. Part of the leaflet reads: "Everyone knows that vegetables are an essential to a properly balanced diet, but their maximum vitamin content is only found in really fresh produce. Compare a crisp lettuce straight from the garden with the limp faded thing it becomes two days later. Its living quality has gone, and with it, most of its food value. All our perishable produce is sold within 24 hours of being picked. The green vegetables you see in our shop have arrived that same day, freshly picked, from our farm. In this shop there is a special section for the sale of produce grown without chemical fertilizers." Woodmans Farm Shop in London is probably the first to develop the commercial possibilities of organically grown food.

From this country, an Ad reaches us by the *Ozark Earthworm Acres,* Box 64, West Plains, Mo., to the effect that they have done everything to put back into the land more than they took out. They too are selling direct from the farm—"seldom more than a few hours from field to you." This shows an opening for many returning men who love the land.

The Interesting Dahlia

By G. L. WITTROCK, New York Botanical Garden

WITH our victory gardens progressing hopefully and a little space reserved for some flowers in general, many of us have chosen the dahlia as our favorite fall flower which can be cultured to give blooms from July until frost in late fall. We accept beautiful flowers, admire them for their merit of color, scent, or form but generally fail to realize that they have a history so interesting that it adds to the appreciation of the flower. The dahlia is one of these.

Long before Columbus discovered America, dahlias were grown in the gardens of the New World. They were not known then as "dahlias", but as "Acoctoli", a native Aztec word meaning a pipe or a water pipe. This word was applied as a descriptive name to the dahlia apparently referring to the hollow stem of the plant. There are indications that some cultivation must have been practised by the natives to account for the complex genetic behavior and the hereditary factors that seem to embody the species. The evidence of this will be revealed as we follow the introduction of the "Acoctoli" into the Old World.

In 1570 Francisco Hernandez, a Spanish physician, was sent by King Phillipp II of Spain to the New World to prepare a natural history of Mexico and report on the natural products of the new country then called New Spain. After seven years of observation and recording, Hernandez finally completed 16 folio volumes of handwritten manuscript and drawings and deposited them in Escorial near Madrid. Nearly a century later these valuable records were destroyed by fire. Fortunately, a duplicate set of certain parts of his manuscript and drawings reached Rome where they were published in 1651. A few of the illustrations are definitely those of "Acoctoli", the first published record of the dahlia.

In 1789 Vicente Cervantes, assistant director of the Botanical Garden in Mexico City, send seeds of "Acoctoli" to Abbe Cavanilles who at the time was in charge of the Royal Gardens of Madrid, Spain. A few years later the Abbe named this new America flower Dahlia pinnata in honor of Dr. Andreas Dahl, one of the leading botanists of the day who had been a pupil of Carl Linnaeus, the father of our present system of naming plants. Being of the opinion that its tuberous roots should make a very satisfactory substitute for the potato, Dahl tried his utmost to popularize it as a food, not as a flower. The promotion was partially successful and it was actually grown in quantity as a food plant in southern France. The bitter flavor in the tubers, however, gradually prevented it from becoming a favorite as a food and thus this practical use of the dahlia was forgotten until recent years.

Some of the original seeds grown in Europe in 1789 showed a tendency to form double flowers. This odd development did not arouse serious interest until a quarter of a century later when the doubling nature of the flower seemed to be

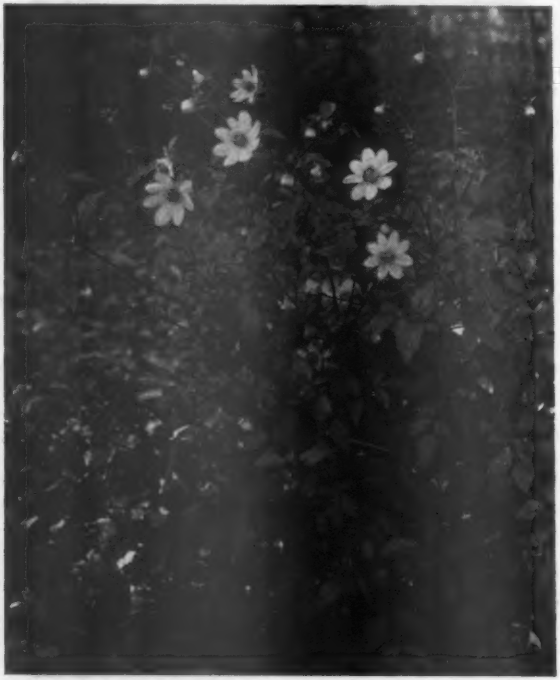
more general instead of the exceptional case. This double flowering habit became the common dahlia of the day and collectively was called Dahlia variabilis. In 1841 over 300 varieties were listed and cultivated but by 1860 the interest seemed to have waned again. It was not until 1872 that true dahlia enthusiasm was reawakened, and this was due to a lone seedling root that had survived in a shipment of many from Mexico to J. T. Van der Berg, a dutch horticulturist. Van der Berg made cuttings and when these bloomed, the flowers were a brilliant scarlet with rolled rays or petals as they are erroneously called. This seedling was named D. Jaurezii in honor of the new President of Mexico. Its resemblance to Cereus speciosissima, a true cactus, made it known as the cactus dahlia or the first cactus type. The parentage of this seedling remained a mystery since nothing like it was ever seen growing wild or in cultivation. This new type stimulated dahlia interest to the extent that over 8000 varieties of all forms have been developed and named and placed under a complex classification of flower types. This classification is usually well defined in any dahlia catalog.

What is the genetics of the dahlia and how explain the multiplicity of form and color? This fascinating question cannot be fully answered but a little of the mystery is understood. The common dahlia is an

"octoploid" genetically speaking, since it has 8 sets of 8 chromosomes or inheritance carriers; in other words, it has 8 times more of the inheritance factors than the wild species. No octoploid dahlia exists in nature, yet this condition apparently was present in the original shipment of seeds received from Mexico in 1789 to account for some of the seeds developing double

D. variabilis. Thus in actual comparative figures, D. variabilis has 32 chromosomes, tetraploids have 16, and wild species have only 8. With this complex genetic structure of chromosomes, a fertile seed of an octoploid parent will develop potentially into a new variety of any imaginable color, shape, type, or structure.

Growing dahlias from seeds al-



flowers. It indicated that hybridization and doubling of chromosomes must already have been existant in the species in Mexico and thus gives evidence that the plants were under cultivation there by the natives. All other cultivated species of dahlia are tetraploid since they have only half of the number of chromosomes of the super hybrid,

ways rewards one for the effort. To an amateur dahlia grower the germination of seeds is constantly of interest, because each seed, as stated, actually produces a new variety, good or bad. Many methods of germinating seeds are suggested and undoubtedly successful. We simply use a propagation flat, filled with screened natural garden

soil taken from the plot in which the dahlia is finally grown. The soil is leveled with a small board and pressed firmly in the flat; then the seeds are placed carefully about 2 inches apart in either direction. After the seeds have been set they are pressed into the soil with the small board so that the flat surfaces of the seeds are still visible. Over this a slight layer of clean sand is sprinkled, usually not more than an eighth of an inch and sprayed lightly with water to keep the sand moist. The flat is then placed in a dark room or dark part of the cellar. This is usually done in February or early March. The seeds germinate within a few weeks, some quicker than others.

As the cotyledons or first seed leaves unfold the plants are exposed to a little light and when the first set of leaves have developed the seedlings are transplanted into 3 inch pots and given more light. When growth has developed fairly well the potted plants are placed out doors in a cold frame and left there under this type of protection until the middle of May. The seedlings are by then developed and can be removed from the pots and placed out in the open, usually in rows from 12 to 18 inches apart. Naturally this is close, but suffices to note the character of the flower when the seedling blooms; if not desirable, the seedling is destroyed. Our experience has been with seed obtained from a deep red variety. Of 26 seeds from this one variety, 60% germinated: 3 were formal, 7 informal, 1 cactus type, and 2 singles. The colors ranged from white, yellow, orange, pink, lilac, and red. One selected orange seedling in the second year reached a height of 11'6" and had flowers suggesting the Jane Cowl type. The monstrous freak was a novelty and a heavy strain on the piping and guy wires we were forced to use for its support. It never had less than 30 flowers at any one time (it was impossible to disbud without the use of a step ladder) and a top spread of over 4'. The stem at the base was almost 3" in diameter.

Let us return to the food and economic possibilities of the plant. As stated before, the dahlia was first introduced as a substitute for potatoes. It failed. Today much has been learned about this plant that is practical. Yellow flowered varieties have a yellow pigment that can be extracted from the floral parts. One authority states that the rays or petals can be served in salads: this would be most decorative as a salad but not too eatable because of the bizarre color combinations. The tubers, however, are truly important. Not only are they food, but a source of a valuable sugar called levulose, which is digestible for those suffering of diabetes, in fact the tuber should be and is added to the diet of those suffering this disease. In 1823 Paven observed levulin in the tubers. This is a chemical substance resembling dextrine and yielding levulose on hydrolysis. Levulose sugars occur in honey and in most sweet fruits. It is the sweetest sugar known. It has also been prepared from the roots of the chicory and Jerusalem artichoke, another species with an interesting historical past which will be discussed in a later paper.

The contents of the dahlia tuber may be summarized as follows:

Fresh tubers

83.3 % water
.74% nitrogenous substances
1.27% sugars
10.33% inulin

Dried tubers

4.42% nitrogenous substances
61.95% inulin

We have often used the tubers as food. We harvest only the discarded varieties, the excess tubers, and the accidents of "broken necks" caused by digging up the roots in the fall and separating the clumps. Only new tubers of the season are used, never the old mother tubers of the previous seasons growth. The tubers are served either boiled like parsnips, baked like sweet potatoes, or mashed like turnips. Light colored varieties suggest the taste of sweet parsnips, while dark colored types are difficult to distinguish from yams or sweet potatoes.

A few hints on failure of dahlia culture. Usually the failures can be traced to too rich soil; early planting, since dahlias do not like cold or too wet feet; or the tubers are planted too close to the surface; or disease, either bacterial or fungoid. If plants have grown rank and tall with few flowers it may indicate too much nitrogen particularly that which is applied chemically. Always leave the tubers in the soil at least a week longer after the plant has turned black with frost; this storage in the soil assures proper curing of the tubers before digging them up; they will survive winter storage much better. A porous, well drained soil containing a natural decayed vegetable compost is all the dahlia requires thus having a soil condition almost similar to that of its native home in the highlands of Mexico.

The American Land

By William R. Van Dersal, THE AMERICAN LAND,

Oxford University Press, $3.75

IF a man would like to know what America was like when it was first farmed by the Indians, what happened to it as the white settlers took over, and where our various crops come from, he would not easily find the book which contains all this information. Do you know how many acres of spinach are grown? Do you know why most of our pears come from the Northwest? How does it happen that tomatoes in the field are not tied to stakes? How much wood becomes available for sawing every year? What is black walnut used for? Where does asparagus grow wild? From which part of the world did we receive the wheat grains? These and thousands of similar questions are answered in the book by Van Dersal. It is not a big book, but it is clearly and interestingly written, it has good paper and will not only appeal to our intellect, but also to our sense of beauty. One of its main values are the illustrations which are carefully chosen and wonderfully executed. No less than 64 full page plates accompany the text. The organic gardener will be especially pleased by the outlook: There is not a word in favor of chemistry and inorganic principles. It is a wholesome book that we can heartily recommend. Meyer.

Over The Fence

By H. K. MEYER

THANKS for the Corn Salad Seeds; they came in from six different states in the Union. We shall see which does best. Did you know that the place where seed was grown may determine whether your plants succeed? If you sow alfalfa, always use seed that comes from a region with a shorter day than your own, usually seed of a more Southern origin. We want to test this out and recently against the rule sowed some seed from the North.

•

The Organic Gardening greenhouse in charge of Mr. William Wanfried has its first self-pollinated bush beans. Transplanting experiments with two and three week old beets and carrots succeeded. It will be interesting to see if the root development and the size is changed compared with untransplanted ones. Naturally, the leaves were cut largely off as is done when trees are transplanted; in transplanting some roots are lost and the surface of leaves has to be decreased accordingly; otherwise the roots cannot supply enough food for the need of the leaves. This idea is being utilized by the new weed eradication sprays: They are hormone preparations which make the leaves grow; and it is the roots which then cannot keep up, so that the plants actually die of malnutrition. They will be of help to the sufferers from poison ivy, but nobody knows as yet how many desirable plants may also be affected by the new discovery. Let's wait and see!

•

News comes from the South Pacific in a letter: "Jack W. is stationed on Saipan, his father sent him some tomato seeds; he and his buddies took good care of the plants, raised a fine tomato patch, but did not get more than one small tomato, all because there were no insects for pollination."—As you know, Saipan had been sprayed with DDT before the invasion. The chemists will not worry as much as the biologists; for they have already developed a new spray that causes tomatoes to set without pollination. Only those tomatoes don't grow seeds for new plants. We could not tamper with nature's time-honored way for long at that rate!

•

Readers ask us often how to eat sunflower seeds. They are cracked between the teeth; pumpkin seeds when well dried can be eaten with the shell, but should be thoroughly masticated.

•

The Massachusetts Institute of Technology has tested various foods for their vitamin content, first on the vine in the field, next when they reached the market, finally when they were served. The loss in vitamins from the fresh product to the one on the table was substantial. This is as expected; we have constantly warned our readers of this.

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Do you know that there is scientific proof that crops grown with artificial fertilizers are less healthy than food grown with organic material composted with manure?

They were published in 1927 in the *Memoirs of the Department of Agriculture of India,* volume 9, pp. 101 ff. Organically grown plants produced seed that germinated best; when rats and pidgeons were fed these seeds, they lived longer in perfect health than when they were fed seed grown with synthetic mineral fertilizers.

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Sage raised for domestic use in the Yakima valley of the state of Washington was sold in 1944 for 42½ cents a pound, according to *The Northwest.* The year before growers received 75 cents.

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The highest average of honey production in any state in the Union was obtained by Montana. During 1944 the average colony produced over 100 lbs. of honey. No wonder, Montana excels in legume seed too.

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Dr. Walther Thomas and Dr. Pauline Mack of the Pennsylvania State College have demonstrated in years of experiments that people are hungry, because they eat meat that comes from hungry animals; unless the plants were well fed, they did not have the proper nutritive value for animal and human consumption. Exactly what the *Organic Gardener* has held for years.

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Some people think we are down on *all minerals.* We are not; every day we answer a dozen letters in which we recommend the use of magnesium, calcium, phosphorus, etc. The Sir Albert Howard method of composting can be used with such materials as ground limestone, dolomite, phosphate rock, etc.

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Can diseased plants be composted too? *The Cross and the Plough,* published by the Catholic Land Associations of England and Wales reports: "Mr. R. A. Wills, of Romsey in Hampshire, is one of our leading market gardeners. Some years ago he lost three acres from wilt fungus. He composted the haulms of the diseased tomato plants with farmyard manure by the Indore process and raised a completely healthy crop on this compost. From about 1½ tons of stable manure plus vegetable wastes he produces eight to nine tons of compost."

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We are getting more and more letters from farmers who ask if composting is practical on a large farm. There are several considerations: A farm must be diversified to become a compost farm; a place without animals cannot make compost on a large scale, though the home gardener can substitute bloodmeal, cottonseed meal, and other organic substances in place of animal matter. Second, equipment such as scoops, manure loaders, cranes, or the like must be available to handle large masses of compost. The result is a saving in cash, since the material is largely produced on the farm, and a saving in expenses for sprays, etc., since healthy crops are grown. With the mulch method added, even cultivation costs can be reduced. We would like to know how many of our readers are practising composting on a farming scale. After all, our forefathers did it. How many of you do? Please drop me a line!

If you have never tried to grow salsify or scorzonera, give it a small trial. These vegetables, creamed or with butter, are as differnt from all others as asparagus is from celery.

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The Wisconsin Valley paper industry formed a non-profit organization, called *TREES FOR TOMORROW*. They are offering every farmer two large seedling trees for each cut down tree, according to the *Pulp and Paper Bulletin*. This is a sound measure; for wood grows slowly and becomes more scarce every year; lumbering has finally entered the stage of a critical industry.

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More and more agricultural devices are being patented. Composting straw with superphosphate was one of the early agricultural patents. There is a recent report that a patent was granted to one man who advocates the whitewashing of trees with limewater. This has been an age-long practice in Europe as well as in Pennsylvania. Another patent was granted for a method of letting two swarms of bees become acquainted; beekeepers have, of course, known for a long time that a piece of paper can be placed between two swarms; by the time the bees have gnawed the hole that will connect them, they know each other's smell and have become friendly. The number of plant patents is also on the increase.

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Did you know that the locusts which John the Baptist ate were not insects, but fruits of a locust tree? The carob or St. John's Bread, as it is called in the Mediterranean region, is the fruit of a tree that is related to the common locust and the wisteria.

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The latest new breed of a plant reported is a sorghum which cannot be used for anything; it was specially bred so that the farmer would not be tempted to cut it down for feed; its sole purpose is that of Soil Conservation.

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Readers of the English classics, especially Shakespeare, were long struck by the reports about the old archers; they could handle a bow and shoot over a distance that no modern man can achieve; the answer is, according to *News Letter on Compost* the "Archer's Loaf". Dr. Warner says that they ate bread which had more nutritive value than modern bread. We would not doubt it.

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Mr. James Rorty and his family, co-author of *The Healthy Hunzas*, recently printed in the *Junior Red Cross*, Sept., Oct., 1944 called at the office and looked over the experimental farm; he was especially impressed with the chicken dropping pit. Like everybody else he noticed that the henhouse had absolutely no odor, even on a day when the windows were down. The droppings are composted naturally as they fall in the pit which is supplied with lime and earth once every week.

Sir Albert Howard Answers

Acid-loving Plants

Q. Is it good to use lime in the compost heap when the compost is to be used with plants that want an *acid soil?*

A. In such cases I should use earth as a means of reducing acidity in the compost heap and omit lime. Lime kills acid loving plants like tea.

—o—

Compost, not Fire

Q. Organic materials, no doubt, contain elements which if isolated and used separately might be poisonous to the soil, even though they are organic in origin. Take the case of saltpetre which is contained in manure. Many years ago the farmers had a process by which they obtained saltpetre out of manure.

Or take the case of vegetable potash. Some factories take organic material such as seaweed and extract potash out of it for sale. How would such potash compare with chemical potash and how with the seaweed itself in the compost heap?

A. With regard to saltpetre I do not think we can regard this as anything more than the final result of the mineralisation of humus, which under certain circumstances is formed in the soil by natural agency and certainly does the plants no harm.

The question of potash from seaweed is rather different. This operation is not a natural one but the result of burning. The final product potassium carbonate sometimes does harm as well as good. Too much of it always ruins the soil texture.

I think it is always better to deal with these organic materials through the compost heap, when we shall get a natural product rather than the unnatural which results from fire.

—o—

Camphor and Orange Rinds

Q. Camphor is somewhat of a strong material and I understand that camphor gum is used to discourage snails. The only other leaf material that I have heard an objection to is the Eucalyptus tree leaf. Do you know of any other strong material that would be taboo in the compost heap?

Dr. Oliver, who has done much work in breeding earthworms, made the statement that orange rinds should not be used in the compost heap, as they discourage earthworms. What would you say about that?

A. I see no reason why camphor leaves should not be used, and as far as my experiments have gone orange rind can also be employed without any harm. As the amount of orange rind available is not very large no earthworm problem is likely to occur.

—o—

When Compost does not heat . . .

Q. One of our readers in the

colder Northwest asks the following question: "Some of my compost heaps did not heat up, perhaps because there was no fresh manure in two of them. I used old, rotten barn-yard manure, I did not see a single worm in it, and the leaves (maple) were stale from rain and weather. They were about two months old." Could you diagnose the situation?

A. The failure of a heap to heat up is probably due to using old manure. It is much better to use fresh manure and a mixture of vegetable wastes. Another factor of course is the size of the heap. *The larger the heap, the better.*

—o—

Iodine Deficiency

Q. In connection with the question of making compost on a farm located in a section where there is a known deficiency in the soil, I recall in *An Agricultural Testament* that in Pusa, India, there was a phosphate deficiency in the upper soil, which was corrected by the leaves of trees that had their roots 20 ft. in the ground. At this lower level there were phosphates.

In this country we have what is known as the Michigan goitre belt. The soil seems to lack iodine. My question is whether leaves would contain the deficient element or would it be better in such sections to get bone meal, dried blood, etc. from other parts of the country? After all, when a family produces all of its own food from its own farm and it is located in a deficiency section, they may be taking a chance. What do you think?

A. With regard to the Michigan goitre belt I think the best thing to do would be to get the soil fertile by means of properly prepared compost and then see what deficiency remains. This question may be settled by this method. If not, then the question of adding iodine to the food of the animals can be dealt with.

Albert Howard.

The Dahlia Pictures

MR. WITTROCK sent us two excellent photographs of widely different Dahlias, one from his own collection, the other from the Botanical Garden of New York. The garden has five Dahlias, collected in the wild state, in Mexico or Guatemala. From an altitude of 2240 feet to the altitude of 8000 feet, these flowers were discovered. The species is found to have either red or yellow flowers; one of the photos shows the yellow flowered type, (page 12), the other is a cultivated plant, (page 11).

Do You Know The Elderbush?

By DORIS CLARK

THE Greeks and Romans planted the elderberry bush (Sambucus nigra) and the old Saxons even considered it a sacred plant. How did this praise come about? And of what use is the elder?

First we must realize that there are six or seven different varieties of this plant, of which only two or three are recommended for human use, especially *Sambucus nigra,* which has yellowish white flower-clusters and blue-black berries. The bark is rough; the stems are full of a pithy substance that once was used for experiments in electricity. Though the leaves have a rather strong odor, some black aphids like the sap of the tree rather well. We are here not concerned with anything but the flowers and the berries. There are a good number of close relatives to the black elder, closest among them the Canadian elder; more remote cousins are Honeysuckle, Viburnum, and Abelia, the pretty late-flowering shrub whose fragrance is so apparent on dewy mornings.

The black elder does not require any attention; it need not be mulched and does not ask for compost; it grows rapidly and can be trained to a rather sizable tree of attractive shape, although the natural form is that of a bush that attains a height of fifteen and more feet. Thus it is well suited to dead corners, to sheltering a trash pile, to filling a gap on a poor spot where other shrubs have difficulties, but it also makes a nice plant in any hedge. It would have to be a very hot summer indeed when the black elder requires water, for its roots reach rather deep, especially on sandy soil. The winter-hardiness has not been thoroughly tested as yet, and we suspect that there are strains that would stand up under the climate of Iowa and Wisconsin. But New Hampshire, Massachusetts, New York, Pennsylvania, Ohio, across the continent through Idaho and into the Northwest are the states where black elder lives and thrives.

In antiquity, the leaves and roots were used for teas which were supposed to affect the liver favorably and keep the gall down. It was also

Sambucus nigra

thought that dropsy could be cured or prevented by them; but we do not know whether there is any basis for these beliefs and whether elder does affect the liver or the heart favorably. But we do know that the flowers have a medicinal effect. When used dried or fresh, the abundance of pollen grains causes perspiration and helps in curing colds; ordinarily a tea is made of the dried flowers. In dried form the flowers have a fine fragrance which is due to a volatile oil that comes

out, like that of vanilla, only in the drying process. A pinch dropped in a pot of boiling water yields an aromatic tea of yellowish color that is particularly agreeable to the palate when a little sweetened with honey. But the flowers should not be boiled.

The flower clusters may also be dipped in a batter of egg, milk, and flour and be fried like doughnuts in hot fat, then sprinkled with sugar. It is an unusual, but tasty dish, though not quite up to the common locust blossoms so cooked. The berries can be made into a wine, but more tasty is a jelly made of the sap of the berries. Since this juice does, however, not have much gelatinous substance such as Pectin, it takes considerable cooking before it gels. Nevertheless, in this form and without any other substances but sugar added, elderberry jelly has a flavor and richness that make it a thoroughly desirable and unique dish. In some respects, it resembles black raspberry, but in others it is singular. We have never tried adding a few quince seeds to improve the gelling quality, but think this a possible help in making the preserve. However, the strength of the jelly would be greater if the juice were allowed to boil down until it forms a thick honey-like substance of dark purple color.

While the flowers have medicinal value, no such significance can with sureness be attributed to the jelly; it just tastes good. After all, this is something most gardeners do not object to, even if it takes about a gallon of juice to make a pint of concentrated elderberry jelly. The bushes bear from a very young age, certainly after the second year; and soon they bear so profusely that not even the most ambitious canner would attempt to dispose of all the fruit available. Nor could she; for the birds that know what is good will feast on the same tree. Still, this is of some help to the gardener, because they leave other fruit alone when they can get onto an elderbush.

Some animals, it is said, do not like the smell of elder, especially not of the leaves. Duppa, an old English botanist, writes: "The green leaves are said to drive mice away from granaries; and the Silesians strew them where their pigs lie, under a persuasion that they prevent some of the diseases to which they are liable." He adds that it blooms in July and that the Romans used the juice of the berry as a dye. The plant-dyes are, as a rule, not stable enough, and elder dye, which resembles purple hollyhock dye on all fabrics, makes no exception to the rule. But while the jelly stains our mouth and lips, we are glad that only its fine flavor lingers on the tongue; its color goes away like that of blueberries.

Inulin

INULIN is a sugar found in Dahlias, Jerusalem artichokes, and other members of the composite family to which asters, sunflowers, zinnias, etc. belong. It does not uniformly dissolve in water and, since man lacks the hormones necessary for digesting inulin, sufferers from diabetes can readily have access to this sugar; they get sweetness, but the system does not use it. In the future it may be possible to use the fertile sugar bottoms of the world for other crops and to utilize relatively poor land for the production of inulin, from which the sweetest sugar, levulose, can be made.

Hints For The Victory Gardener

This is the thirty-first of a series of articles by this author dealing with the cultivation of ordinary vegetables

SOY BEANS

By ROGER W. SMITH

MUCH praised in recent years this introduction from the Orient should find welcome in your Victory garden. It is a very rugged, drought resistant plant practically free from plant disease and rather immune to attack from Mexican bean beetle and the Japanese beetle. This matter of freedom from insect infestation or a tendency towards it is important. There seems to be some connection between the degree with which a given plant is resistant to a given insect pest and its place of origin. For example, you may have noticed that green beans (a European introduction) are much preferred by the Mexican bean beetle to the Limas (native to much of the area in which the Mexican bean beetle is a native). Thus it would seem that the soy bean should be little bothered by the Japanese beetle, a common pest in its home grounds.

Soy beans will thrive on light or on clayey soil but your garden should have reasonable drainage. If the soil is poor it should be improved by the addition of a thin layer of mature compost humus lightly dug in near the surface. The little that is used will be more than repaid when the stalks, pods, and root masses are returned to the compost heap for the soy is a recognised soil builder.

The soy bean delights in warm weather. If you can manage to sow the seed when you sow your sweet corn well and good; if you are too busy, the sowing of the soys can wait a week or two.

Soy bean plants reach a height of about two feet, are erect and self supporting. The rows should be about three feet apart and the plants about two inches apart in the row. Care should be taken not to set the seed too deeply, one half inch or less is deep enough. A good method to avoid covering the seed too deeply, soil caking, and other troubles, is to run a string across the garden to mark where the row is to stand, place the seed on the surface and cover with a half inch layer of sifted compost humus, sand, or a mixture of both, and firm carefully.

If you have never grown soy beans in your garden before, should the seed be "inoculated" for success? By inoculation, of course, is meant the sowing with the seed of a small amount of a culture medium containing the micro-organisms commonly found in soil around the roots of mature soy bean plants which assist in the early growth of the plant. More than likely, if your garden receives only a scattering of properly made compost such inoculation will not be necessary. Little is yet understood of this matter, but tests would seem to indicate that most of the micro-organisms necessary to healthy plant life, even the "specialists" are present in properly composted organic matter; just how many varieties of micro-organisms, each esential to the

growth of some definite plant form has yet to be learned. The presence of a wide variety of micro-organisms in composted humus may be one of the reasons why almost minute applications of this substance sometimes produces results altogether out of proportion to the amount of plant nutrient contained.

There are many varieties of edible, heavy-bearing, soy beans available to you today. Prominent are Bansei, 96 days to maturity, and Funk Delicious, 105 days. Immature beans may be gathered as baby limas are gathered, according to domestic demands or to satisfy your desire to find out what they taste like. When immature, shelling is made easier if the green beans are submerged briefly in boiling water. The pods may then be easily snapped in the center and the young seeds forced out between thumb and forefinger.

As the seeds reach maturity they become spherical, the plant sheds its leaves, revealing its heavy load of brown pods. Mature pods split easily but usually do not shatter badly in the harvesting. The dry beans assume their "lima bean" form if soaked in water overnight.

Soy beans are considered better than navy beans for baking because they contain about twelve times as much fat as navy beans and four times the protein of eggs. They contain more iron than spinach and about 60% more calcium than cow's milk. They are also a fine source of Vitamin A, B1 and B2.

You have gathered enough green soy beans to satisfy the Victory gardener's wife, you harvested and shelled enough dry beans to help out over the coming winter, only a heap of brown and empty pods remain. Dry and withered, these inedible husks would seem to have filled their purpose in protecting and nurturing the vital seed they bore. But if you propose to save a few handfuls of your own grown soy beans to be used for seed next year, you will consider these dried pods very thoughtfully.

Old time gardeners have long believed that beans germinated and grew better if the dry pods were planted with the seed. Recent investigation tends to show that there may be much truth in this old idea. For it may be that the withered pods either bear sufficient of the micro-organisms necessary to proper growth of the seed or encourage their activity in the soil.

At any rate, your few rows of soy beans will provide yourself and your family with a heavy amount of valuable and healthful foodstuff, they may also provide you with many interesting problems well worth your serious contemplation.

Hops For Human Food

IN HOP-GROWING regions the gardener might well consider getting some cuttings to start a few stocks; they are not only suitable to arbors or other coverings, but also yield a delicious salad: The young hop sprouts, cut before they come to the surface, can be cooked like asparagus. Care must be taken not to cut all sprouts, but to leave enough for growth so that the following year the root stock gives us even more. Three stocks yield enough salad for one meal for a family of four.

An Interesting Letter

Dear Mr. Rodale:

Before the arrival of "Compost and How to Make It", I had a time problem with compost making. The introductory pamphlet brought in a new light. I responded as quickly as possible. "Compost and How To Make It" showed me the way. On the primitive two year method, someone had always thrown out the compost raw material as "hopeless".

I have never used chemical fertilizers on our yard, neither has my mother or father. I have known by logic, chemicals being unnatural, that something about them was unsound and dangerous. However, we have used rotenone and nicotine sulfate. We find nicotine sulfate inefficient as insecticide. In 1943 Phlox paniculate plants thrived without rotenone. In 1944 after being dusted with rotenone, they all languished. Three out of one clump of seven died suddenly after a dusting. I then became also suspicious of insecticides. Rotenone-treated beans were actually eaten up with bean leaf beetles! We found that the beetles actually seemed to thrive on Rotenone! The tomato patch lacked humus and the crop practically failed. We thus haven't tried to grow vegetables since 1943. We had nothing but crop failures.

Two years and four months ago as I had just reached the age of twelve years and started in Boy Scouts, I took over all gardening in our yard. My interest had really started just before the war in Europe. I have long planned to have a farm some day. More and more all the time since about two years ago I have planned to use compost and exclude chemicals. I especially distrusted chemicals after the arrival of your pamphlet.

Two days ago I thoroughly read my first copy of your magazine. I plan to organize an organic gardening club some day. If a compulsory chemical fertilizer law should ever be enforced, I would write all sorts of pamphlets and play politics against it, and maybe make the club I should organize into a political party. I plan to obtain a paper route next summer and continue on it long. I may very likely use the money earned to buy a small farm. I may then save and expand in acreage. There will be a high demand for my compost grown crops.

I have heard of a use of various grass species (*Gramineae*) as human food. I suppose Kentucky bluegrass to be especially good. (*Poa pratensis* is the botanical name). Two boys once used it as food and became unusually healthy. It has a somewhat bitter taste at first until one becomes used to it. All green leafy vegetables once seemed somewhat bitter. Poa pratensis or blue grass has a wonderful supply of vitamins. Compost improves it; chemicals ruin it. What is your opinion?

Yours truly,
Robert Allen Heazlitt,
New Albany, Indiana.

Rock Garden Plants

IT HAS BEEN shown that plants that like calcium (lime) do not need so much water as plants that prefer silica soils. Perhaps the plants that grow on porous limestone had to learn how to get along without much water.

Some Garden Experiences

By M. G. KAINS,

Author of the best seller "Five Acres and Independence"

ABOUT twenty years ago, obliged to sell my farm and buy a plot in the village, I had a piece of land about 25 feet long and 12 wide for my vegetable area. The soil—save the name!—was largely coarse gravel!

As I dug the ground, raked and removed the larger stones and made the clods smooth with a rake, I scattered liberal amounts of pulverized sheep manure, medium fine steamed bone meal and fine phosphate rock—no other manure or chemical fertilizer.

The first year I had planned to grow 100 plants of everbearing strawberries (Mastodon variety), 12 or 15 inches apart. As I knew that these would not, at first, need all the area, I sowed quick-growing vegetables—Grand Rapids lettuce (a "leafing" variety I had known since the early nineties); onion sets and Crimson Giant radishes—they grow as large and heavy as a golf ball. On one side, I planted parsley seedlings (bought in the store) to be an ornamental border; opposite it, I sowed Old Homestead (Kentucky Wonder) climbing beans, allowing only three plants to grow full size to climb on stalks eight feet high. All of these vegetables did fairly well, considering the poor soil and the short time the fertilizers had.

The strawberries started to bear in July and continued until November (and that, about 30 miles north of New York City); at freezing time loaded with green berries and blooms. Had I been able to protect them with a coldframe, I could probably have had ripe fruits until Christmas! I estimated that the yield was at least a quart on the average.

As the property had been neglected for many years the area was full of weeds. These I cut out, made into piles and added lawn grass, weeds, etc., from time to time, and some of each of the fertilizers mentioned above, dusted with some lime and covered with earth, wherever I could scrape up any on the place. Then I kept the pile moist. When each pile "settled" by rotting, I gathered the outsides and converted them into a new pile with the original inside as the outside.

Incidentally, I had only two places for my compost piles, one in a corner right outside the living-room and the kitchen—much to the disgust of Mrs. Kains, because she dreaded smell and flies. I told her she should not have married a horticulturist, because he would certainly have at least two humus heaps! Much to her surprise she noticed neither smell nor flies because the pile was covered with soil and moistened often.

In the autumn or the next spring I sliced the pile vertically down with a square spade and threw the pieces upward on a mason's sieve to let the fine soil pass through and the coarse stuff tumble down in front. The parts not yet rotted, stalks and similar material, I used on the ground to form the foundation of the next pile while the sifted

humus went into the garden. In the seventeen years I lived there the improvement was surprising; a great amount of delicious fruit and vegetables were produced.

Since then I have grown other varieties of everbearing strawberries. I have found Champion (Progressive), the sweetest, though a smaller producer; Gem, superior to Mastodon, in flavor, but earliest and biggest bearing in its second year; and Green Mountain, the poorest of all I have ever grown, in color, and bearing season.

Last year, my son grew Old Glory, which he found made a much greater quantity of fruit, number of runners, and healthy plants of best flavor.

Reader's Correspondence

Send stamped self-addressed envelope for reply.

TIME FOR COMPOSTING

Q. It seems my compost does not get quite ready in time. Does that matter?

Utecht, Jackson, Fla.

A. As to the question of compost, it varies very much according to what has gone in originally. Some people get smooth compost, *crumbly like the humus of an old garden* rich in organic substance, others have still *stringy material* when the time is over. So much depends on what earth has gone into the heap, how rich it was in old bacterial life, etc. But on the whole, it seems, if we can judge from the enormous correspondence on this subject, such compost is quite suited to being put in the soil; if it should not be fully matured the remaining stage can well take place under ground.

If you intend to have more heaps this year, you might give them a bit longer for the first stage of breaking down under the influence of heat and air; that will probably be wise for a more Northern climate. Be sure that the heaps are moist and shaded!

READER'S REQUEST:

Q. Can you suggest a *reasonably priced grinder* which might be used for cutting up grass and leaves for compost making?

R. E. Bogardus,
South Jacksonville, Fla.

A. DO ANY OF OUR READERS HAVE INFORMATION ON THIS MATTER?

—o—

SQUASH AND CANTALOUPE

Q. If I should plant summer squash with my cantaloupe for use as a catch crop to destroy the pickle worm and allow the squash to remain until the cantaloupe too are blooming, would they cross and thereby destroy the flavor of this season's cantaloupe?

B. L. Cole
St. Louis, Mo.

A. The chance that cantaloupes and summer squash cross-pollinate is very remote and unlikely. Ordinary pumpkin and crookneck squash as well as Hubbard, Boston Mar-

row, Turban, and other fall squashes do occasionally cross and even give rise to fertile offspring; but melons like the cantaloupes are farther removed in evolution; they may cross with cucumbers and gherkins, but also only under difficulty. You may therefore plant your garden as you had planned without danger to taste and flavor.

—o—

HYDRANGEA

Q. Will you kindly advise how to prepare soil to make it acid?

My sons have given me a blue hydrangea several years ago for Mothers Day. The three are in service overseas and I would like to get the plants to bloom in the garden if possible. They make fine foliage plants but no blooms.

B. M. Fenzel,
Chicago, Ill.

A. If your hydrangea do not bloom maybe they ought to be transplanted in fresh soil. They require mainly water and a large amount of liquid manure. If you think your soil is not acid enough, you can use some peat moss which you can buy at the seed stores. As a rule, however, hydrangea succeeds whenever the soil is well nourished and moist and the location not too sunny. This soil is best prepared by the addition of compost.

—o—

MOLES

Q. If you will please send the name of a remedy to rid the ground of moles and ground squirrels I shall certainly appreciate it.

Mary E. Holladay,
Nashville, Tenn.

A. We realize that a pretty lawn can be very much upset by moles and ground squirrels. However, a mole as well as a ground squirrel eats more than its weight in grubs every day. If your soil is rich, many such grubs would thrive unchecked if it were not for the moles. They are necessary in nature and we do not feel that one should destroy them because those grubs and worms would destroy your flowers and vegetables if they were left unchecked. But if your lawn is very dear to you and you think you absolutely *must* kill the moles, you had best use some bait which your seed store will supply.

—o—

ROTTED CHICKEN MANURE

Q. Is rotted chicken manure good for potatoes and the garden generally?

Edwin Heckman,
Hampton, N. J.

A. You can use rotted chicken manure for the purposes you indicate, and you can also use it in liquid form by dissolving it in water and pouring it around your crops, especially now for beans, cucumbers, squash, and tomatoes, as well as for potatoes. The latter, however, would do better if the manure had been added last year, because they may go to leaf if too richly fertilized now. Altogether, we should say that the chicken manure should be first composted and that the compost should be used as a top dressing; then you run no risk.

—o—

YELLOW SPOT

Q. What causes leaves of African violets to become spotted with yellow spots?

Mrs. Ernest Bartholomaei,
Detroit 19, Mich.

A. Most frequently such discolor-

ations are due to a lack of proper plant food or to inadequate aeration which prevents the plant from utilizing the available food. The same is true of yellow spots, they indicate that no outside pest, like fungus, is responsible. You might sprinkle wood ashes on the soil and gently work them in, which will also aerate the roots. Most likely an application of phosphorous material is indicated. The best would be bone meal or hoof shavings, which had, however, better be first softened in water. As the horn disintegrates, it releases gases of a bad odor. This is the time to apply the mixture to your flowers; next year you might use phosphate rock on your ground.

—o—

SOWBUGS

Q. Please tell me how to get rid of pillbugs or sowbugs.

Mrs. W. E. Piper,
Bartlesville, Okla.

A. The best way of ridding your garden of Pill bugs is by encouraging toads and lizards. By constantly enriching your land with compost eventually some reasonable equilibrium will come about through the action of nature. There are, of course, some baits available, but we have always managed to get along without them by encouraging the natural enemies of the pests. A little moist spot in the shade should attract toads which eat the sow bugs.

—o—

NEMATODES

Q. I had great success with compost and worms in my garden the past season despite nematodes. I wish to know how to eliminate this pest?

Neola McDavid,
Atlanta, Ga.

A. The only sound means of combating nematodes is rotating of crops and using compost. If you planted radishes and cabbages and similar plants of the mustard family too long in one spot, nematodes develop. The addition of some lime may curb the disease, but the best system would be to plant peas and beans on the infested soil and start your cabbages, etc. on a new bed and keep them rotating.

It has been found out that compost made with animal manure greatly reduces nematode infection. We hope that next year you have an adequate compost pile to get its good effects.

—o—

EUCALYPTUS LEAVES

Q. Are eucalyptus leaves dangerous to earthworms?

A. We have a good many eucalyptus trees on our place, but we do not compost the leaves. The reason for this is not because there is any detrimental effect on the soil or on earthworms, but because there is a considerable oil content in the leaves of pepper, eucalyptus and camphor trees and the leaves rot very slowly. Also, in the production of leaf mold, the bacteria of the soil are one of the main factors in breaking down and transforming the leaves, and in the oily leaves bacterial action is slow.

When we compost leaves for earthworm food, we mix in chicken manure, rabbit manure, or other manures, with other vegetable material, such as garbage, and the material is also mixed with enough earth to prevent heating. The re-

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sulting soil is a very fine soil. So far as "neutralizing soil" is concerned, we do not believe that any detrimental effect can be obtained through the neutralizing action of vegetation. The best soil for practically all food crops is very near the neutral point, or slightly acid. It is only with chemicals that you can produce a degree of alkalinity high enough to be detrimental to vegetation.

Thos. J. Barrett,
Earthmaster Farms,
Roscoe, Calif.

—o—

LAKE MUD

Q. I have a summer home on a small lake in Michigan. This lake becomes covered with docks from early spring until fall, when the green leaves of the docks dry up and disappear under the surface. The bottom of the lake is covered with a thick layer of black material. Would this make a good fertilizer or should it be mixed in the compost heap?

Joseph Votava,
Berwyn, Ill.

A. The material in the bottom of the lake would be very useful if you allowed it to become disintegrated before you apply it. It is very rich in organic matter and requires the action of bacteria that live in the air. Thus you had best spread it out flat and put straw or other light material in layers between the muck to break it up.

—o—

PHOSPHATE ROCK

Q. How many pounds of phosphate rock would I need for 9000 square feet of space?

F. J. Peticolas,
Simsbury, Conn.

A. The Illinois Experiment Station recommended 2,000 pounds of phosphate rock per acre every three or four years until the phosphoric acid in the soil would amount to 5,000 pounds per acre. If you were to follow this recipe, you would have to apply between 200 and 500 pounds every three or four years. In other words, you cannot add too much phosphate rock for practical conditions.

—o—

PLOWING

Q. From what I read in your magazine am I right in presuming that you do not advocate plowing in the customary manner? If so what do you advocate instead?

For years I have been sowing a cover crop in the Fall, usually rye. Do you sanction such practise and if so how would you handle it in the Spring? I follow city gardening only.

P. P. Thomas
Asheville, N. C.

A. We follow the same practices as you have adopted according to your recent letter. We plow and use cover crops besides composting methods. But we advocate mulching in orchard practice as well as for certain garden produce; this has sometimes been misunderstood by readers as being the equivalent of Faulkner's methods. We have, of course, been glad to let Mr. Faulkner express his ideas inasmuch as they cover a phase of organic treatment suited to certain conditions, but that does not mean that we have identified ourselves entirely with his theories. The traditional method of spading works, together with the addition of organic matter to the soil, for a well-aerated ground in which the plant food be-

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